

REMARKS

Claims 8-12 are pending. Claims 1-7 have been canceled.

Claims 8-12 have been added to claim a "process for converting a bridged metallocene of formula (IIa) into a bridged metallocene of formula (II)." Support for claims 8-11 is found on pages 8, line 15, through page 11, while claim 12 finds additional support on page 22, lines 31-35.

All of the examiner's rejections under 35 USC §§ 101 and 112 have been overcome by new claims 8-12.

Claim 12, which contains the same solvents as in former claim 3, is an independent claim and thus not subject to the rejection in item 5 of the office action. However, applicants believe that present claim 8 is generic to a mixture of aprotic hydrocarbons with other nonhydrocarbon solvents since claim 8 does not exclude the additional solvents.

It is also believed that the new format of claims 8-12 overcomes the examiner's rejection in item 3 of the office action.

Claims 1-4 stand rejected as anticipated by Repo et al. (*J. Org. Chem.*, vol. 541, pp. 363-366 (1997)).

According to the examiner the article discloses the reaction of the lithium salt of 2,6-di-tert-butyl phenol or 2,6-di-isopropyl phenol with  $\text{Cp}_2\text{ZrCl}_2$  in THF to form the corresponding mono- and diphenoxy derivative. Claims 8-12 are now directed to a process to convert compound of formula (IIa) to compound of formula (II). Compounds

of formula (II) and (IIa) are bridged bis indenyl metallocene derivatives. Thus, they are completely different from the unbridged bis cyclopentadienyl metallocene disclosed by Repó et al. Accordingly, claims 8-12 are not anticipated by Repo et al.

Favorable action by the examiner is respectfully solicited.

**A check in the amount of \$410.00 is attached to cover the required two month extension fee.**

Please charge any shortage in fees due in connection with the filing of this paper, including Extension of Time fees to Deposit Account No. 11-0345. Please credit any excess fees to such deposit account.

Respectfully submitted,

KEIL & WEINKAUF



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Reg. No. 24,070

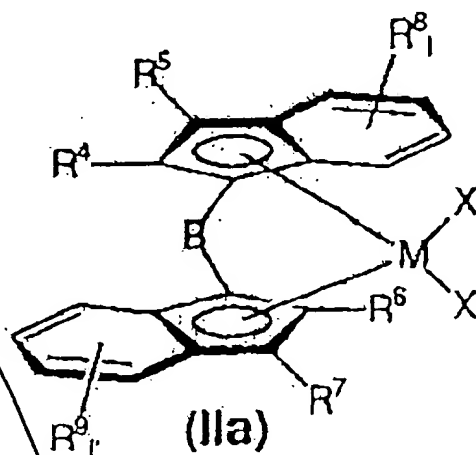
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**MARKED-UP VERSION SHOWING CHANGES MADE**

Cancel claims 1-7, and add new claims 8-12 as follows:

8. (new) A process for converting a bridged metallocene of formula (IIa)



where

M is Ti, Zr or Hf,

R<sup>4</sup>, R<sup>6</sup> are identical or different and are each hydrogen or a C<sub>1</sub>-C<sub>20</sub> group,

R<sup>5</sup>, R<sup>7</sup> are identical or different and are each a hydrogen atom or a C<sub>1</sub>-C<sub>20</sub> group,

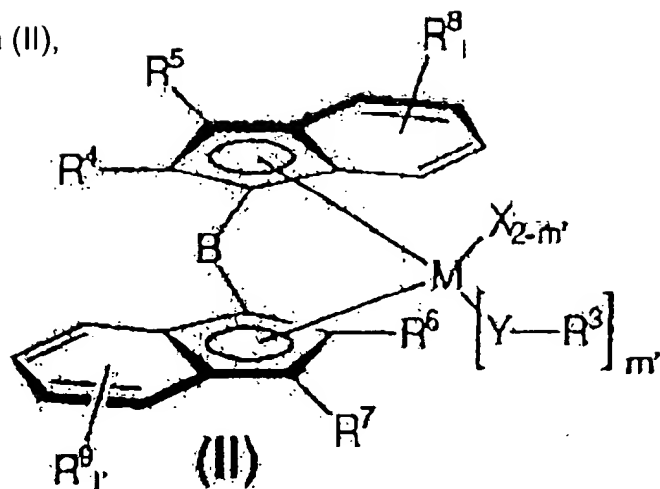
R<sup>8</sup>, R<sup>9</sup> are identical or different and are each a hydrogen atom, a halogen atom or a C<sub>1</sub>-C<sub>30</sub> group, and two radicals R<sup>8</sup> and R<sup>9</sup> may form a monocyclic or polycyclic ring system which may in turn be substituted,

1, 1' are identical or different and are each an integer from zero to 4,

X is a halogen atom, and

B is a bridging structural element between the two indenyl radicals,

to a bridged metallocene of formula (II),



where

M, X, 1, 1', B, R<sup>4</sup>, R<sup>5</sup>, R<sup>6</sup>, R<sup>7</sup>, R<sup>8</sup> and R<sup>9</sup> have the same meaning as above,

Y is an element of main group VI of the Periodic Table of the Elements,

m' is 1 or 2, and

R<sup>3</sup> are identical or different and are each halogen or a C<sub>1</sub>-C<sub>30</sub> group;

comprising the steps

- reacting a bridged metallocene of the formula (IIa) with a ligand exchange component



where

Y and R<sup>3</sup> are as defined above,

M<sup>1</sup> is a cation, a cationic fragment, or an ammonium cation corresponding

to an amine,

to form the bridged metallocene of formula (II),

- optionally separating off solid residues of the formula M<sup>1</sup>X,

- c) optionally separating off the inert solvent or solvent mixture,  
d) recrystallizing the bridged metallocene of the formula (II) from an aprotic hydrocarbon, and  
e) separating the compound of the formula (II) from the mother liquor.

9. (new) The process of claim 8 wherein in the bridged metallocenes of formula (IIa) and (II):

M is zirconium,

$R^3$  are identical or different and are each hydrogen atom or a  $C_1$ - $C_{10}$ -alkyl,  $C_2$ - $C_{12}$ -alkenyl,  $C_6$ - $C_{24}$ -aryl,  $C_5$ - $C_{24}$ -heteroaryl,  $C_7$ - $C_{30}$ -arylalkyl,  $C_7$ - $C_{30}$ -alkylaryl, fluorinated  $C_6$ - $C_{24}$ -aryl, fluorinated  $C_7$ - $C_{30}$ -arylalkyl, or fluorinated  $C_7$ - $C_{30}$ -alkylaryl group,

$R^4$ ,  $R^6$  are identical or different and are each hydrogen atom or a  $C_1$ - $C_{18}$ -alkyl,  $C_2$ - $C_{10}$ -alkenyl,  $C_3$ - $C_{15}$ -alkylalkenyl,  $C_6$ - $C_{18}$ -aryl,  $C_5$ - $C_{18}$ -heteroaryl,  $C_7$ - $C_{20}$ -arylalkyl,  $C_7$ - $C_{20}$ -alkylaryl, fluorinated  $C_1$ - $C_{12}$ -alkyl, fluorinated  $C_6$ - $C_{18}$ -aryl, fluorinated  $C_7$ - $C_{20}$ -arylalkyl or fluorinated  $C_7$ - $C_{20}$ -alkylaryl group,

$R^8$ ,  $R^9$  are identical or different and are each a hydrogen atom, a halogen atom, or a  $C_1$ - $C_{30}$ -group, and two radicals  $R^8$  and  $R^9$  may form a monocyclic or polycyclic ring system which may in turn be substituted.

10. (new) The process according to claim 8 where in the compounds of formula (IIa) and (II):

$R^5$ ,  $R^7$  are hydrogen atoms,

X is chlorine,

Y is oxygen or sulfur,

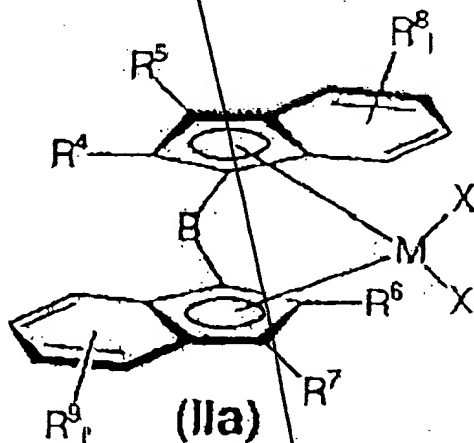
1, 1' are 1,

m' is 1, and

B is  $(\text{CH}_3)_2\text{Si}$ ,  $(\text{CH}_3)_2\text{Ge}$ ,  $(\text{C}_6\text{H}_5)_2\text{Si}$ ,  $(\text{C}_6\text{H}_5)(\text{CH}_3)\text{Si}$ ,  $\text{CH}_2\text{CH}_2$ ,  $\text{CH}(\text{CH}_3)\text{CH}_2$ ,  $\text{CH}(\text{CH}_2\text{H}_9)\text{C}(\text{CH}_3)_2$ ,  $\text{CH}_2$ ,  $\text{C}(\text{CH}_3)_2$ , or  $(\text{C}_6\text{H}_5)_2\text{C}$ .

11. (new) A process according to claim 8 wherein a polar or nonpolar, aprotic hydrocarbon or hydrocarbon mixture is used in step d).

12. (new) The process for converting a bridged metallocene of formula (IIa)



where

M is Ti, Zr or Hf,

$\text{R}^4$ ,  $\text{R}^6$  are identical or different and are each hydrogen or a  $\text{C}_1\text{-C}_{30}$  group,

$\text{R}^5$ ,  $\text{R}^7$  are identical or different and are each a hydrogen atom or a  $\text{C}_1\text{-C}_{20}$  group,

$\text{R}^8$ ,  $\text{R}^9$  are identical or different and are each a hydrogen atom, a halogen atom or a  $\text{C}_1\text{-C}_{30}$  group, and two radicals  $\text{R}^8$  and  $\text{R}^9$  may form a monocyclic or

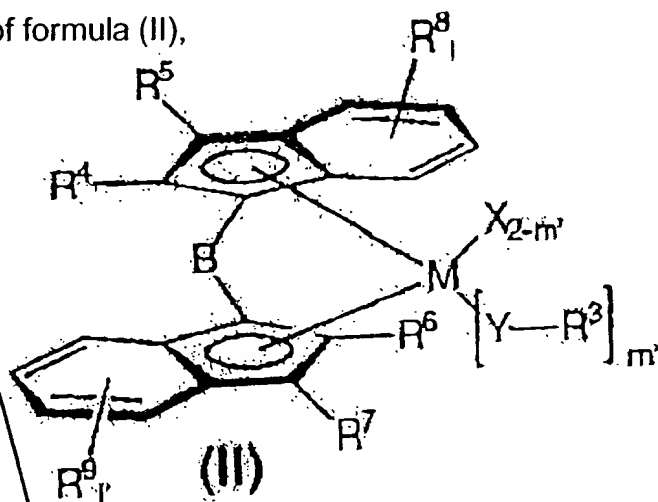
polycyclic ring system which may in turn be substituted,

1, 1' are identical or different and are each an integer from zero to 4,

X is a halogen atom, and

B is a bridging structural element between the two indenyl radicals,

to a bridged metallocene of formula (II),



where

M, X, 1, 1', B, R<sup>4</sup>, R<sup>5</sup>, R<sup>6</sup>, R<sup>7</sup>, R<sup>8</sup> and R<sup>9</sup> have the same meaning as above,

Y is an element of main group VI of the Periodic Table of the Elements,

m' is 1 or 2, and

R<sup>3</sup> are identical or different and are each halogen or a C<sub>1</sub>-C<sub>30</sub> group;

comprising the steps

- a) reacting a bridged metallocene of the formula (IIa) with a ligand exchange component



where

Y and R<sup>3</sup> are as defined above,

M<sup>1</sup> is a cation, a cationic fragment, or an ammonium cation corresponding to an amine,

to form the bridged metallocene of formula (II),

- b) optionally separating off solid residues of the formula M<sup>1</sup>X,
- c) optionally separating off the inert solvent or solvent mixture,
- d) recrystallizing the bridged metallocene of the formula (II) from a solvent selected from toluene, hexane, heptane, xylene, tetrahydrofuran (THF), diomethoxyethane (DME), toluene/THF, heptane/DME or toluene/DME, and
- e) separating the compound of the formula (II) from the mother liquor.